3. (Original) The microfluidic device of claim 2, wherein actuation of the lysing mechanism subjects cells in the lysing zone to an electric field sufficient to release the intracellular material.

4. (Original) The microfluidic device of claim 3, wherein actuation of the lysing mechanism subjects substantially all of the cells in the lysing zone to the electric field to prepare a microdroplet comprising the released intracellular material.

5. (Original) The microfluidic device of claim 4, further comprising a gas actuator to provide a gas pressure sufficient to move the microdroplet comprising intracellular material to a position downstream of the positioning element.

6. (Original) The microfluidic device of claim 2, wherein the positioning element is disposed downstream of the lysing zone to position an upstream portion of the cell-containing microdroplet in the lysing position.

7. (Original) The microfluidic device of claim 6, wherein the positioning element increases a surface tension of a downstream surface of the cell-containing microdroplet to thereby inhibit downstream movement of the microdroplet.

8. (Original) The microfluidic device of claim 7, wherein the positioning element comprises an amount of reduced-wetting material disposed to contact a portion of the downstream surface of the cell-containing microdroplet.

9. (Original) The microfluidic device of claim 8, wherein the reduced wetting substance is hydrophobic.

10. (Original) The microfluidic device of claim 7, wherein the positioning element is configured to increase a radius of curvature of a downstream surface of the cell-containing microdroplet.

11. (Original) The microfluidic device of claim 10, wherein the positioning element comprises an upstream portion and a downstream portion of the positioning element, the downstream portion having a greater cross sectional area than the upstream portion.

12. (Original) The microfluidic device of claim 2, wherein the positioning element is disposed upstream of the lysing zone to position a downstream portion of the cell-containing microdroplet in the lysing position.

13. (Original) The microfluidic device of claim 12, wherein the positioning element comprises a vent to substantially equalize a gas pressure upstream of the cell-containing microdroplet with a gas pressure downstream of the cell-containing microdroplet when the microdroplet is in the lysing position, to thereby inhibit movement of the cell-containing microdroplet downstream from the lysing position.

14. (Original) The microfluidic device of claim 13, further comprising a valve to obstruct passage of gas between the lysing zone and the vent.

15. (Original) The microfluidic device of claim 2, wherein the positioning element positions the cell-containing microdroplet without completely obstructing passage of material from a location upstream of the positioning element to a location downstream of the positioning element.

16. (Amended) A microfluidic device for processing a cell-containing fluid, comprising:
a lysing zone;[[,]]

a lysing mechanism to release intracellular contents from cells <u>of cell-containing fluid present</u> within the lysing zone; and

a gas actuator to provide a gas pressure sufficient to prepare a microdroplet comprising intracellular contents released from cells of the cell-containing fluid within the lysing zone.

17. (Original) The microfluidic device of claim 16, wherein the fluid of the cell-containing fluid is a liquid.

18. (Original) The microfluidic device of claim 17, wherein actuation of the lysing mechanism subjects at least some cells in the lysing zone to an electric field sufficient to release the intracellular contents of the cells.

19. (Original) The microfluidic device of claim 18, wherein the microdroplet is essentially free of cells that have not been subjected to the electric field.

20. (Original) The microfluidic device of claim 17, wherein actuation of the gas actuator moves the microdroplet to a location downstream of the lysing zone.

21. (Original) The microfluidic device of claim 20, wherein the microdroplet comprises less than about 90 percent of the cell-containing fluid.

22. (Original) The microfluidic device of claim 16, wherein the device comprises a substrate, and wherein the lysing zone and gas actuator are integral with the substrate.

23. (Original) The microfluidic device of claim 22, wherein the gas actuator comprises a heat source to heat an amount of gas thereby increasing a pressure of the gas.

24. (Original) The microfluidic device of claim 16, wherein the device further comprises a positioning element to position a portion of the cell-containing fluid in a lysing position with respect to the lysing zone, whereby actuation of the gas actuator prepares the microdroplet from the cell-containing fluid thereby positioned in the lysing zone.

25. (Original) The microfluidic device of claim 24, wherein the positioning element increases a surface tension of a downstream portion of the cell-containing fluid to thereby inhibit downstream movement of the cell-containing fluid.

26. (Original) The microfluidic device of claim 24, wherein the positioning element comprises a vent to substantially equalize a gas pressure upstream of the cell-containing fluid with a gas pressure downstream of the cell-containing fluid when the cell-containing fluid is in the lysing position to thereby inhibit downstream movement of the cell-containing fluid downstream from the lysing position.

27. (Original) A microfluidic method for processing a cell-containing microdroplet, comprising: positioning the cell-containing microdroplet in a lysing position with respect to a lysing mechanism of a microfluidic device; and actuating a lysing mechanism to release intracellular material from cells of the cell-containing microdroplet.

28. (Original) The microfluidic method of claim 27, wherein the positioning step comprises increasing a surface tension of a downstream surface of the microdroplet to thereby inhibit a downstream movement of the microdroplet.

29. (Original) The microfluidic method of claim 28, wherein the positioning step comprises contacting the downstream surface of the microdroplet with a hydrophobic material.

30. (Original) The microfluidic method of claim 28, wherein the positioning step comprises increasing a radius of curvature of the microdroplet.

31. (Original) The microfluidic method of claim 27, wherein the positioning step comprises substantially equalizing a gas pressure upstream of the microdroplet with a gas pressure downstream of the microdroplet.

32. (Original) The microfluidic method of claim 27, wherein the actuating step comprises subjecting cells of the microdroplet to an electric field sufficient to release intracellular contents from the cells.

33. (Original) A microfluidic method for processing a cell-containing fluid, comprising: providing the cell-containing fluid to a lysing zone of a microfluidic device; actuating the lysing mechanism to release intracellular contents from cells of the cell-containing fluid within the lysing zone; providing a gas pressure sufficient to prepare a microdroplet comprising intracellular contents released from cells of the cell-containing fluid within the lysing zone.

34. (Original) The microfluidic method of claim 33, wherein the fluid of the cell-containing fluid is a liquid.

35. (Original) The microfluidic method of claim 33, wherein actuating the lysing mechanism subjects at least some cells within the lysing zone to an electric field sufficient to release the intracellular contents of the cells.

36. (Original) The microfluidic device of claim 35, wherein the microdroplet is essentially free of cells that have not been subjected to the electric field.

37. (Original) The microfluidic device of claim 17, wherein the step of providing the gas pressure moves the microdroplet to a location downstream of the lysing zone.

38. (Withdrawn) A microfluidic substrate for processing fluids comprising: a lysing module for releasing intracellular material from cells within the sample to thereby forming a lysed sample, a microdroplet formation module for forming a first microdroplet of fluid from the lysed sample, a mixing module for mixing said first microdroplet with a second microdroplet comprising a reagent to form a third microdroplet, and an amplification module for amplifying intercellular material within said third microdroplet.